June 14, 2018

MEMORANDUM FOR: Ian Mead
Assistant Administrator for Energy Analysis

FROM: Jim Diefenderfer
Director, Office of Electricity, Coal, Nuclear, and Renewables Analysis

SUBJECT: Summary of AEO2019 Coal Working Group held on May 17, 2018

The working group presentation provided a summary of the AEO2018 projections, as well as the data, assumptions, and model updates and improvements expected during the AEO2109 development cycle. Stakeholders were encouraged to discuss the information provided in the presentation, EIA's coal modeling methodology, and other issues facing coal supply and use. The EIA presentation is provided as a separate document. Participants and other stakeholders were encouraged to contact Greg Adams (Greg.Adams@eia.gov) or David Fritsch (David.Fritsch@eia.gov) if they had any follow up questions or comments.

Background

At the outset, EIA staff mentioned that AEO2019 will be a short AEO cycle and will include the 6 core side cases (High/Low Macro, High/Low Oil Price, High/Low Oil and Gas Resource and Technology cases), along with the Reference case.

EIA staff explained that the first working group meeting was being held earlier in the development cycle than in the past to discuss the results in the recently-released AEO2018 and solicit stakeholder feedback for consideration in future modeling efforts at an earlier stage in the development cycle. The first working group meeting also provides an opportunity to identify issues or topics that might be better addressed through smaller, targeted working group discussions.

Results (AEO2018)

The meeting began with a review of assumptions and trends affecting the AEO2018 projections. The discussion of current laws and regulations highlighted that the AEO2018 did not include EPA's Clean Power Plan, but that all cases assume EPA's New Source Performance Standards limits for CO2 emissions from new plants. The assumptions associated with other existing federal and state regulations were discussed, along with the status of other potential actions previously proposed by other federal agencies.

Staff from National Energy Technology Laboratory was invited to comment on their efforts to assess methods for addressing regulatory uncertainty in energy modeling systems such as National Energy Modeling System in relation to EIA's continued inclusion in the AEO2018 of a 3% cost of capital adder on new coal-fired generating units or upgrades at existing coal facilities not achieving 90% carbon capture and sequestration (CCS).

EIA staff highlighted three key assumptions affecting the Reference case coal projection—coal mine labor productivity by region, global seaborne coal trade demand, and capital costs for adding new coal-fired electric generation relative to renewables and natural gas. Three key trends affecting the coal projections were also noted—relatively flat electricity demand growth, increasing electricity generation from renewables, and only modestly increasing projected real prices for natural gas, which is influenced by the natural gas supply and demand balance.

EIA staff highlighted the results for the AEO2018 Reference case, while demonstrating the sensitivity of the coal generation and capacity projections to changes in natural gas prices. In particular, the results showed how the decline in coal electric generating capacity retirements is projected to be generally offset by increasing capacity factors for the remaining coal fleet in the Reference case, resulting in a projection of flat coal-fired electricity generation and coal production.

Coal production trends by region were also presented, with Eastern Interior production from the Illinois Basin showing modest gains relative to the other regions due in part to differences in projected labor productivity trends. Employment and mine mouth coal price projections reflect the general decline in labor productivity in an environment of flat production. Coal export demand is projected to grow modestly by 2040 and stabilize thereafter.

Model updates (AEO2019)

Looking forward, EIA staff highlighted development initiatives for AEO2019 and beyond. In addition to the normal base year updates to the coal model, updates for AEO2019 include the Tax Cuts and Jobs Act of 2017, the Section 45Q tax credit for CCS, updating the coal supply curves in the model, and enhancing reporting capabilities. Preliminary results of a study by Sargent and Lundy for EIA on costs of O&M at aging electric generating units and evolving efforts to address coal and nuclear generation at risk were also discussed, along with the planned update to the capital cost study for new generating units. EIA requested that participants consider these efforts and provide any suggestions they may have with respect to technologies to be evaluated or comments on resilience, reliability, and fuel diversity. Work on a new International Coal Market Module (ICMM) has also been delayed.

EIA also sought feedback from participants on formation of a new working group to provide guidance on Short Term Coal Projections. Please contact Greg Adams (Greg.Adams@eia.gov), David Fritsch (David.Fritsch@eia.gov), or Elias Johnson (Elias.Johnson@eia.gov) if you want to join this group.

Discussion

Questions and comments from participants mainly revolved around the topics of model assumptions, fuel diversity, and the impact of renewables.

Model Assumptions

One participant indicated that EIA should review the impact of EPA's Effluent Limitation Guidelines (ELGs) as they affect retirement decisions for coal plants. In their Integrated Resource Plans, some electric utilities have cited cost of compliance with ELGs as a major consideration in plant retirement decisions.

Another participant submitted comments following the meeting, with respect to Eastern Interior coal labor productivity trending upward in EIA's projections. That participant felt that the shift in the mix of mines by equipment and size is probably the biggest driver of productivity changes, as opportunities for new technological changes until the U.S. starts using autonomous or remote equipment may be limited. However, at some point the mix is likely to stabilize due to low demand and, therefore, productivity for the region would not necessarily show an overall increase in labor productivity in the longer-term.

One participant inquired whether a clean coal-fired generating technology without CCS could be included as a technology type. EIA staff indicated that a clean coal-fired generating technology without CCS could potentially be incorporated into a future side case, but not likely for AEO2019. EIA plans to run only major side cases for AEO2019 and, given current laws and regulations, each case assumes that 111(b) will remain in effect. Such technologies would only be included in AEO2019 to the extent that EPA completes a rulemaking repealing 111(b) prior to the completion of EIA's model development efforts. EIA will study the technology and could possibly include an option for a clean coal-fired generating technology without CCS in the future if reliable costs and performance characteristics can be developed for that technology.

Fuel Diversity

One participant commented that in addition to costs and profitability, coal plant retirement decisions may depend on plant ownership—for example, Investor Owned Utilities want certainty in cost recovery, and cooperatives and municipal utilities look at the impact on customer's rates, while IPPs make decisions purely on operating cost or profit margins. Mixed co-ownership of plants means that decisions to retire a plant may be dynamic between ownership groups.

This participant also commented on the issue of resiliency, noting that fuel security is a main driver, and is more important than operating flexibility. Coal plants, even after modifications to improve ramp rates, will not compare favorably to the flexibility of natural gas plants. One advantage of coal plants is they do not depend on the natural gas grid for fuel supply being available in times of cold weather, or in the instance of a natural gas transmission system bottleneck, many plants using gas have limited liquid fuel backup on site. Therefore, fuel security may result in some coal plants being kept in service longer than expected.

Another participant inquired as to whether DOE's Office of Fossil Energy could review a copy of the Sargent & Lundy study on coal fleet aging mentioned by EIA staff. This participant also asked if the report examines the cumulative impacts of operating a plant in a non-baseload manner like cycling, and if EIA plans to publish its methodology for identifying plants at risk to the extent a framework is put into place.

EIA staff indicated that it would publish a hyperlink on the EIA website to the Sargent and Lundy report once the report is finalized by the contractor and summarized by EIA staff. EIA further noted that the Electricity Market Module includes a feature to adjust the generating unit heat rate depending on the mode of unit operation. EIA staff also noted that any changes to proposed methods associated with "plants at risk" would certainly be discussed at the coal and electricity working groups, and documented in the AEO assumptions and model documentation.

Impact of Renewables

A participant inquired whether the reserve margin algorithm has been modified given the increased penetration of renewables. EIA staff responded that an algorithm to calculate spinning reserves was added three years ago, which includes a placeholder parameter for wind and solar. Variable generation sources like wind and solar do not contribute to spinning reserves, but they may increase the need for spinning reserves.

EIA staff also indicated that they are reviewing literature to help determine what the parameter should be, but it was not updated in AEO2018. ForAEO2019, EIA staff indicated that the time slices will be changed to 24/12 for the renewable dispatch algorithm, which should improve the representation of capacity credits for renewables and the dispatch for all generation types, including renewables.

Another participant asked about the impacts of the tax credits on renewable capacity additions. EIA staff responded by referring the participant to the recently-released AEO2018 Issues in Focus article on "Alternative Policies in Power Generation and Energy Demand Markets."

Attendees

Guests (in person)

Name	Affiliation
José Benitez	Energy Ventures Analysis
Mark Gehlhar	U.S. Department of Interior, OSRME
Jordan Kislear	U.S. Department of Energy

Guests (WebEx/phone)

Name	Affiliation
Frank Benevidas	Alliance Energy
Jen Digiantommaso	U.S. Dept. of Labor, OFCO
Carolyn Evans	Norfolk Southern
Jerry Eyster	GE Energy Financial Services
Brian Fisher	U.S. EPA
Philip Graeter	Energy Ventures Analysis
Jamie Heller	HELLERWORX, INC
Whitney Herndon	Rhodium
Lauren Khair	National Rural Electric Cooperative Association
Catie Kuester	Union Pacific
Michael Leitman	National Rural Electric Cooperative Association
Carl Lundgren	U.S. Department of Labor, MSHA
Emily Medine	Energy Ventures Analysis
Greg Moxness	U.S. Department of Labor, MSHA
Naomi Ondrich	U.S. Department of Labor
Joshua Rockwell	U.S. Department of Interior, OSMRE

Robert Schultz	LEENA Laboratories
Frances Wood	OnLocation
Thomas Wos	Tri-State G&T
Charles Zelek	U.S. Department of Energy, NETL

EIA attendees (in person)

Name
Greg Adams
David Daniels
Jim Diefenderfer
David Fritsch
Tyler Hodge
Thad Huetteman
Augustine Kwon
Laura Martin
Ian Mead
Chris Namovicz